

ELLIPTIC METAVERSE REPORT 2022

The Future of Financial Crime in the Metaverse

Fighting Crypto-crime in Web3.0

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What is the Metaverse?

The metaverse is a term which applies to the broad range of technologies that aim to merge the social connections of the real world with the innovations of the digital age. Where this blend occurs with traditional companies such as Snapchat's augmented reality filters, the proliferation of social media apps on our mobile devices, or giant multiplayer gaming worlds such as Fortnite, this is considered to be the web2.0 metaverse. Meanwhile, where the metaverse has decentralized ownership and control, this is known as the web3.0 metaverse.

The phrase "metaverse" was first coined in Neal Stephenson's 1992 novel *Snow Crash*. The book describes a world where governments have been replaced by corporations, the global economy has collapsed, and citizens escape from this bleak reality by accessing a virtual world through headsets. Here, their avatars can roam the digital street, own a virtual property and socialize with others.

This dystopian future isn't the backdrop for the growth of the metaverse in our world. Instead, it has evolved through the increase in digitalization and emergence of new technologies, with the introduction of the web3.0 metaverse coming in the wake of multiple cryptoasset and blockchain innovations.

An online survey of 100 Elliptic customers and crypto and finance professionals – carried out in May 2022 – found that at least 58% of respondents expected the metaverse to deliver some commercial opportunity for their business within the next five years. This suggests significant potential for involvement from both crypto-native and more traditional financial institutions.

Tellingly, at least 66% of respondents are already in the process of, or have an intention to assess their risk of metaverse-related fincrime vectors, many of which we will outline in our typologies section.

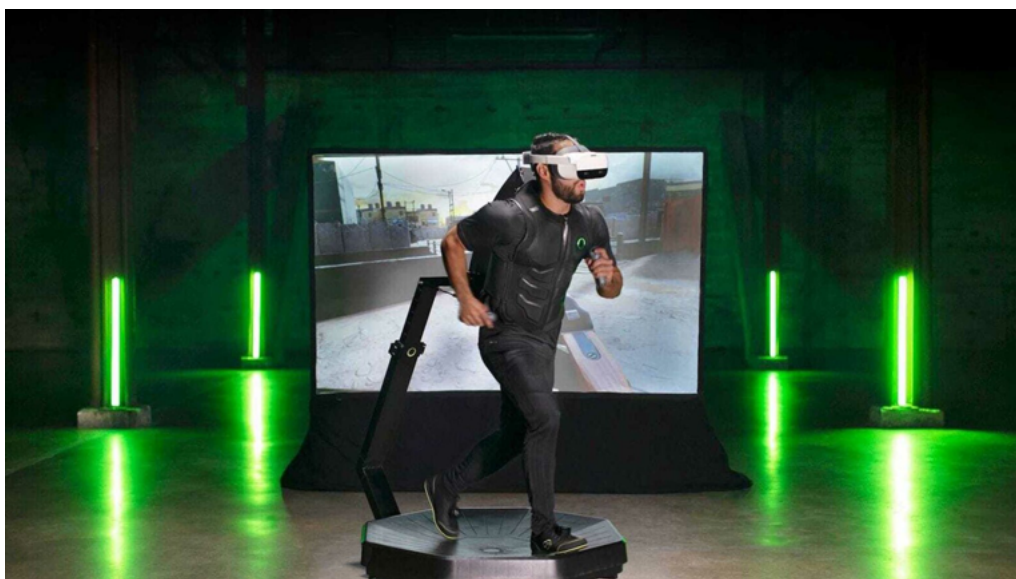
Components of the Metaverse

There are a number of foundational concepts to explain in order to understand what a metaverse is:

How you access it

With the release of Meta's Oculus Rift and Google's Daydream, virtual reality headsets are now an entry point of choice to access metaverse services – just as predicted in Stephenson's book. However, improvements in hardware will offer the ability to wear haptic suits to physically experience the metaverse and 360 treadmills will allow for more realistic mobility through the digital world. Therefore, while much of the web2.0 metaverse is accessed through mobile devices, laptops and gaming consoles, the web3.0 metaverse is expected to be much more immersive.

Coupled with this – and since they're not constrained by physical capacity limitations – is the ability for metaverses to host vast numbers of people simultaneously. Demonstrating this, gaming metaverse Fortnite hosted over 10 million virtual attendees at the Marshmello concert in 2019 and Travis Scott's gig in April 2020 saw over 12 million, with many connecting through their mobile devices.



A 360 treadmill being used with a virtual reality headset

There are often no barriers to entry for a metaverse, with a device or cryptoasset address serving as a gateway into the world and no identity checks being required. As such, the expectation is that the tech savvy generation z and generation alpha will embrace the metaverse's open door policy in much the same way that millennials adopted social media apps.

What's Available to See and Do

While the jury is still out on whether any metaverse-related apps have truly gone mainstream, there are plenty of options to explore. Meta's Horizon Worlds offers virtual meeting rooms and social spaces, Decentraland brings virtual land and wearables, and gaming platforms like Roblox or Minecraft offer massive multiplayer experiences. In addition, we've seen significant institutional investment and adoption from tier-one banks looking to embrace the metaverse. HSBC announced a metaverse partnership in March 2022¹ and JP Morgan opened up a metaverse space – complete with virtual tiger – in February 2022². There have also been moves by governments and regulators, such as the Barbados government announcing its plans for the world's first metaverse embassy³ and Dubai's digital asset regulator revealing that it intends to create a virtual HQ⁴. Furthermore, there are interactive art exhibitions such as Philip Colbert's Lobsteropolis⁵ where users must locate hidden objects within the lobster-themed space, NFT art galleries with VIP spaces only admitting those with certain blockchain-based tokens in their wallet, and virtual sandwich delis where your creation can be entered into a real life sandwich competition⁶.

In line with this growing number of metaverse-based services and businesses, technology research firm Gartner predicts that by 2026, 30% of organizations from the real world will be ready to offer metaverse-related goods and services⁷ and that 25% of people will spend at least one hour a day immersed in it⁸. The metaverse therefore goes beyond a mirroring of goods and services available in the real world to become an extension of what's possible.



I happily played World of Warcraft during 2007-2010, but one day Blizzard removed the damage component from my beloved warlock's Siphon Life spell. I cried myself to sleep, and on that day I realized what horrors centralized services can bring. I soon decided to quit.

**Vitalik Buterin, Co-founder of
the Ethereum blockchain.**

Who “Owns” it

Another key consideration for metaverse creation is whether the space is centralized – and therefore created, owned and controlled by an organization – or decentralized and owned by members of the metaverse community. Typically, centralized metaverses are usually referred to as web2.0 metaverses, while the decentralized versions are web3.0 metaverses.

- **Centralized Metaverses**

One of the first metaverses – although it predates the use of the term – was Second Life, which launched in 2003. This giant multiplayer game saw people create avatars and live their virtual lives, with over 8 million monthly users at its peak in 2016⁹, tapering to a still-impressive 30,000 active users per month¹⁰ in 2022. More recently was the millennial obsession with The Sims – a game originally released in the year 2000 and now on its fourth iteration – which sees players control the lives of virtual characters. However, the long-term popularity of The Sims has been eclipsed by generation z’s interest in newer massive multiplayer games such as Fortnite, Roblox and Minecraft. Notably, in these metaverses, you can own land and purchase wearables such as clothing and accessories, although these remain in the control of the companies who develop and operate the virtual world and for whom these have emerged as significant revenue drivers. This model of in-game purchases led Fortnite to deliver \$5.1 billion in revenue in 2020¹¹.

Under the control of a single entity, these centralized metaverses retain the ability to unilaterally make changes to the environment or prohibit players from entering the space. While this can have many benefits – such as protecting players from potential harm – centralization has led to some unforeseen consequences, such as being the original inspiration for the Ethereum blockchain:

“I happily played World of Warcraft during 2007-2010, but one day Blizzard removed the damage component from my beloved warlock’s Siphon Life spell. I cried myself to sleep, and on that day I realized what horrors centralized services can bring. I soon decided to quit.” Vitalik Buterin – Co-founder of the Ethereum blockchain¹².

- **Decentralized Metaverses**

Buoyed by the success of centralized metaverses yet intent on placing user-ownership and control at the fore, decentralized web3.0 metaverses offer users the ability to own and trade goods within the metaverse, but utilize cryptoassets as the underlying mechanism. This prevents any one entity from having unilateral control over the metaverse.

The possibility for ownership and control stems from the creation of metaverse assets as tokens based on a blockchain. The most popular token standard is ERC721 – also known as non-fungible tokens (NFTs). These tokens have unique properties which allow them to represent a host of different and unique objects in the metaverse.

In addition to the ERC721 token standard, there has also been the adoption of other blockchain-based technologies such as Proof of Attendance Protocol (POAP), which acts as a digital wristband to immutably show that you attended a metaverse event – such as a conference, festival or a wedding. This can bring both social status as well as exclusive access into other events and areas within the metaverse.

In addition, the metaverse also makes use of ERC20 tokens, which are fungible assets and more closely represent a digital form of money.

Hey vitalik.eth! (0xd8dA...6045)

These are the events you have attended in the past

2022

2021

Example of Proof of Attendance Protocol (POAP) with Vitalik's public wallet

The companies building each layer of the metaverse

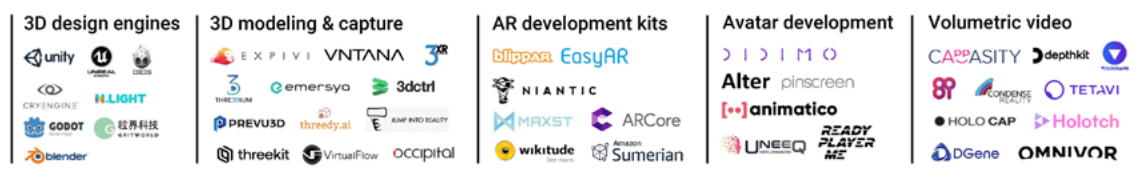
Infrastructure (network & computing)



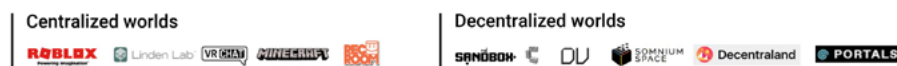
Access/interface (hardware)



Virtualization tools



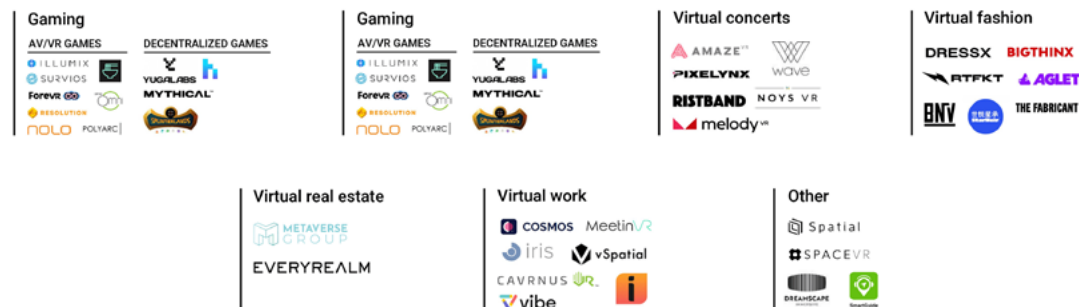
Virtual worlds



Economic infrastructure



Experiences



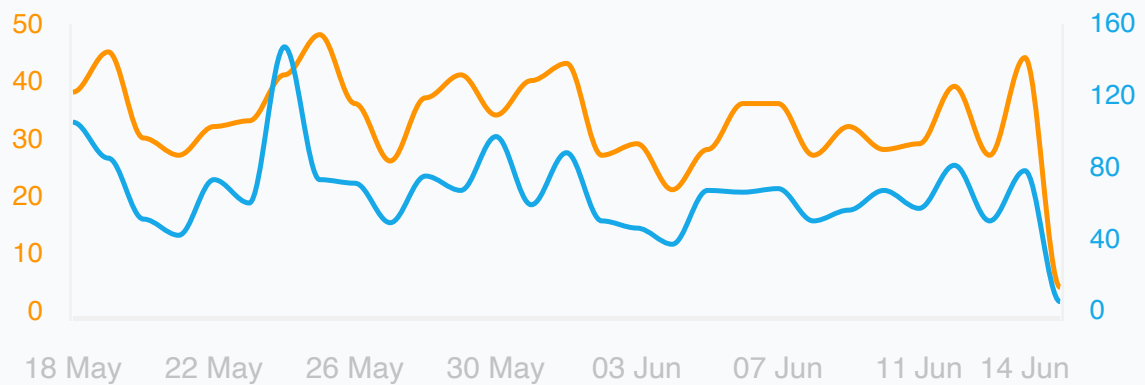
Source: <https://www.cbinsights.com/research/metaverse-market-map/>



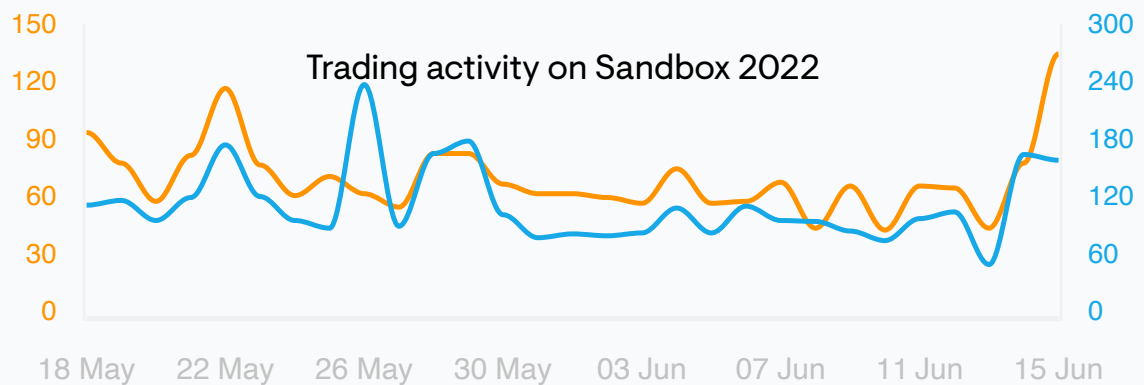
The report author at Genesis Plaza within Decentraland

There are a number of challengers for the decentralized metaverse top-spot, with The Sandbox, Illuvium, and Otherside among others looking to replace Decentraland as the go-to-metaverse. They are all seeing growing user numbers and more active markets for land and wearables.

Trading activity on Decentraland 2022



Trading activity on Sandbox 2022



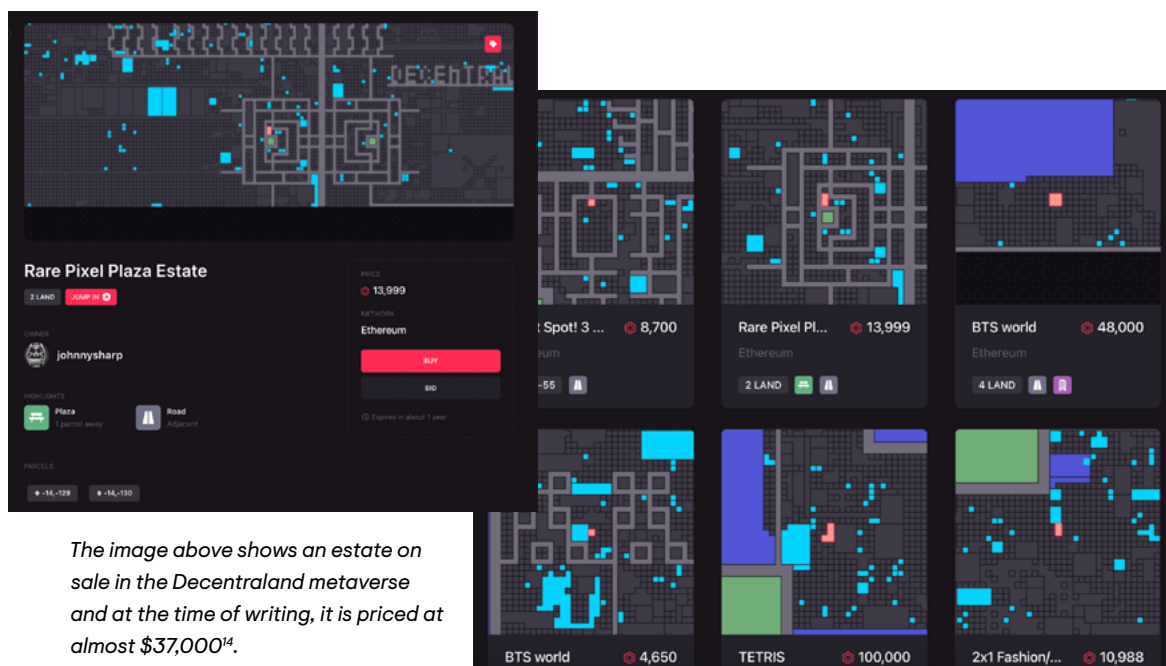
■ Users
 ■ Transactions

Within the web3.0 metaverse – which is what this report will focus on – there are a number of key assets.

Land

In the majority of metaverses, it's possible to buy virtual plots of land and either hold it in the hope of future price rises or use it to build on. Users can create virtual art galleries to showcase their owned NFT artworks, build visitor centers for company marketing, create games which can be playable for cryptoassets, and a myriad of other constructions.

Land is represented by an NFT, which provides immutable ownership for the user since this is stored on a blockchain.



Meanwhile, the image below shows this report's author standing on some undeveloped land which is on sale for over \$1.6 million¹⁵.



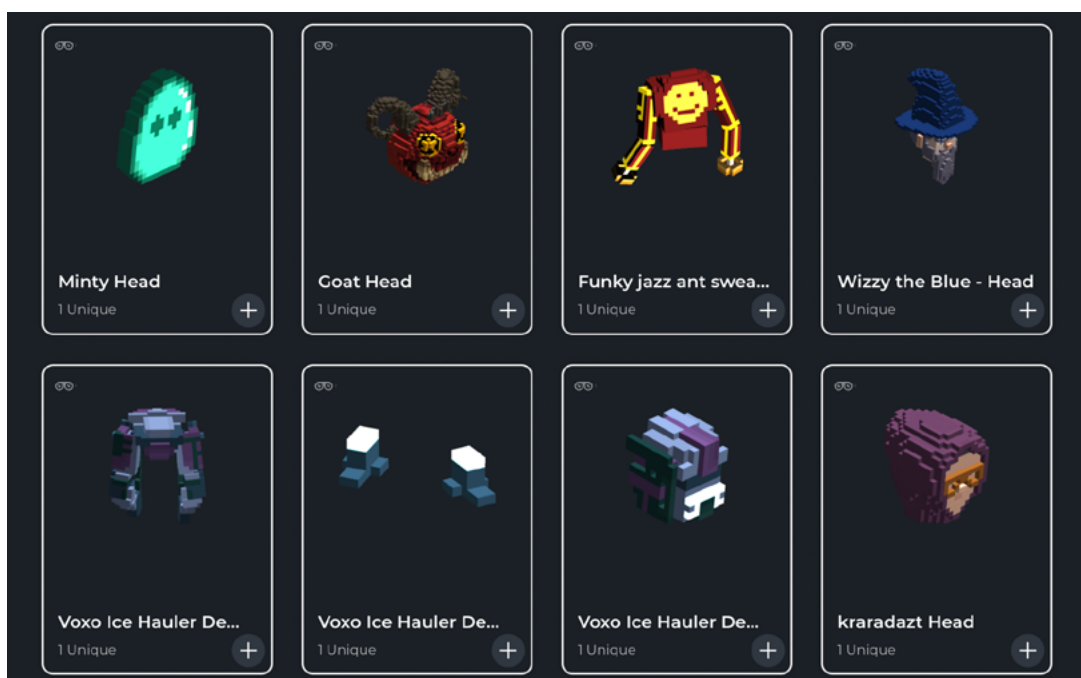
These eye-watering prices for virtual land are not atypical, with one estate in The Sandbox selling for \$450,000 – due to having Snoop Dogg as a virtual neighbor – and the average land sale in Decentraland is around \$6,000¹⁶. While there is no universal pricing model for metaverse land, factors in Decentraland which can impact price are: proximity to a road (the light gray areas on the map); proximity to a plaza (an area for common use often featuring general crypto information and learning opportunities); being located within a district (large purple areas in the map) and proximity to a “Place of Interest” (denoted by a yellow star on the map and therefore easier to find). There are already a small number of metaverse estate agents and brokers who will help prospective land owners secure their desired estate for the most favorable price and ensure they are buying in an up-and-coming area.

The majority of metaverses have a limited amount of land for sale, either released in bulk at the launch of the project or via tranches as the metaverse grows in popularity. The Sandbox initially released land in a discount presale and then a number of public sales which will continue to happen over the next few years.

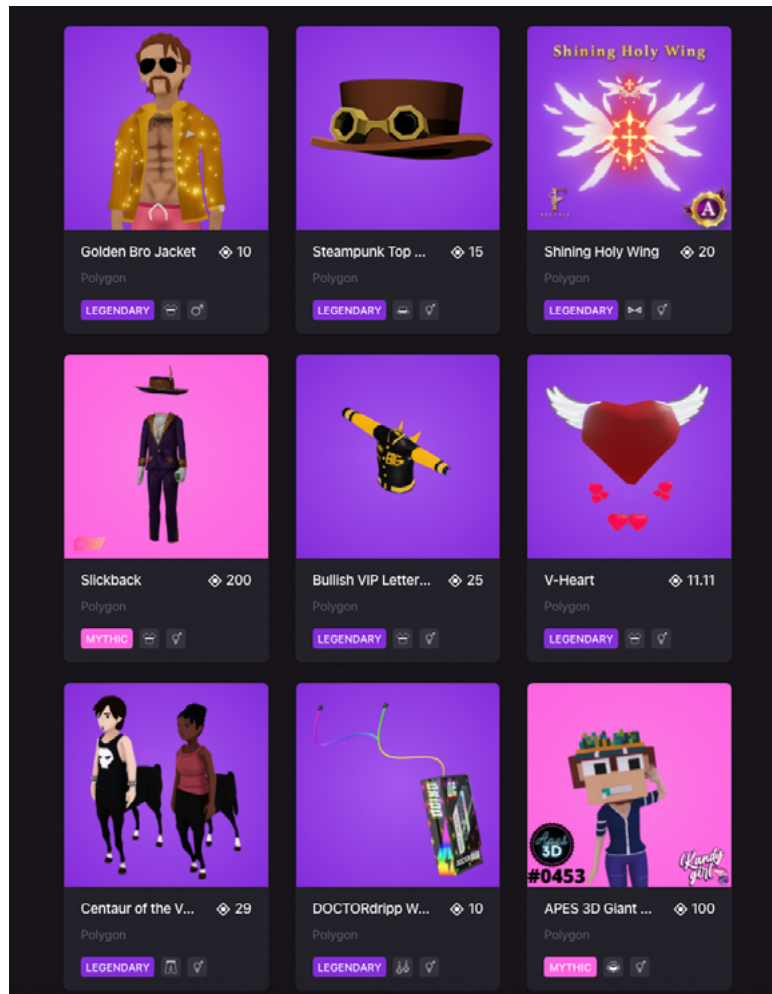
However, there is an active secondary market on NFT marketplaces such as OpenSea, where users can purchase land directly from other owners. This is usually in ETH, WETH or an ERC20 asset specific to the metaverse.

Wearables

Wearables – also referred to as “skins” – are clothing and accessories for avatars in the metaverse. There are now many metaverse fashion houses which develop wearables and even some traditional fashion houses are making moves into the space. These include Nike and RTFKT’s metaverse sneaker partnership¹⁷, Gucci’s continued play into the space¹⁸, Balenciaga’s wearable drop in Fortnite¹⁹ and even Snoop Dogg creating virtual wearable collections²⁰. As with metaverse land, wearables are NFTs with data stored on a blockchain. Therefore, creation, ownership and transference information is all stored immutably on the network.



Some wearables available to purchase on Decentraland



In line with much of the cryptoasset market – such as the growth of profile picture project (PFP) NFTs where NFTs are used as profile pictures across social media – elaborate and creative wearables are a statement of wealth and a display of social standing within the crypto crowd. Certain wearables can show you belong to particular crypto factions, have attended various events of note or show that you work for a specific company, for instance.

Similar to metaverse land, there is an active primary and secondary market for metaverse wearables, with many metaverses hosting their own on-platform marketplaces. Over the last year, wearable sales on the Decentraland market have seen steady growth and over 71,000²¹ wearable items have been created.

Some of this growth is likely driven by an increase in people accessing the metaverse, but there is also a significant expectation that the metaverse will provide plentiful commercial opportunities. As a result, more developers are entering the wearable space and starting to design luxury and custom wearables to sell at a premium. An additional driver has likely been the first ever Metaverse Fashion Week (MFW). This took place in March 2022 in Decentraland and hosted virtual shops from luxury fashion houses such as Tommy Hilfiger, catwalks shows by Dolce & Gabbana and a host of events offering access to limited-edition wearables. As with virtual land, there is no universal pricing model for wearables. Instead, aspects such as rarity (how many pieces have been created), the creator (whether they are a notable creator or company in the space), and whether it is following a real world or metaverse trend help to set the price for a wearable.

Native Assets

With metaverses looking to provide a virtual world with goods and services, there needs to be a currency to facilitate trading. As such, many metaverses will have their own native asset which users make use of to buy land, wearables and any services and applications.

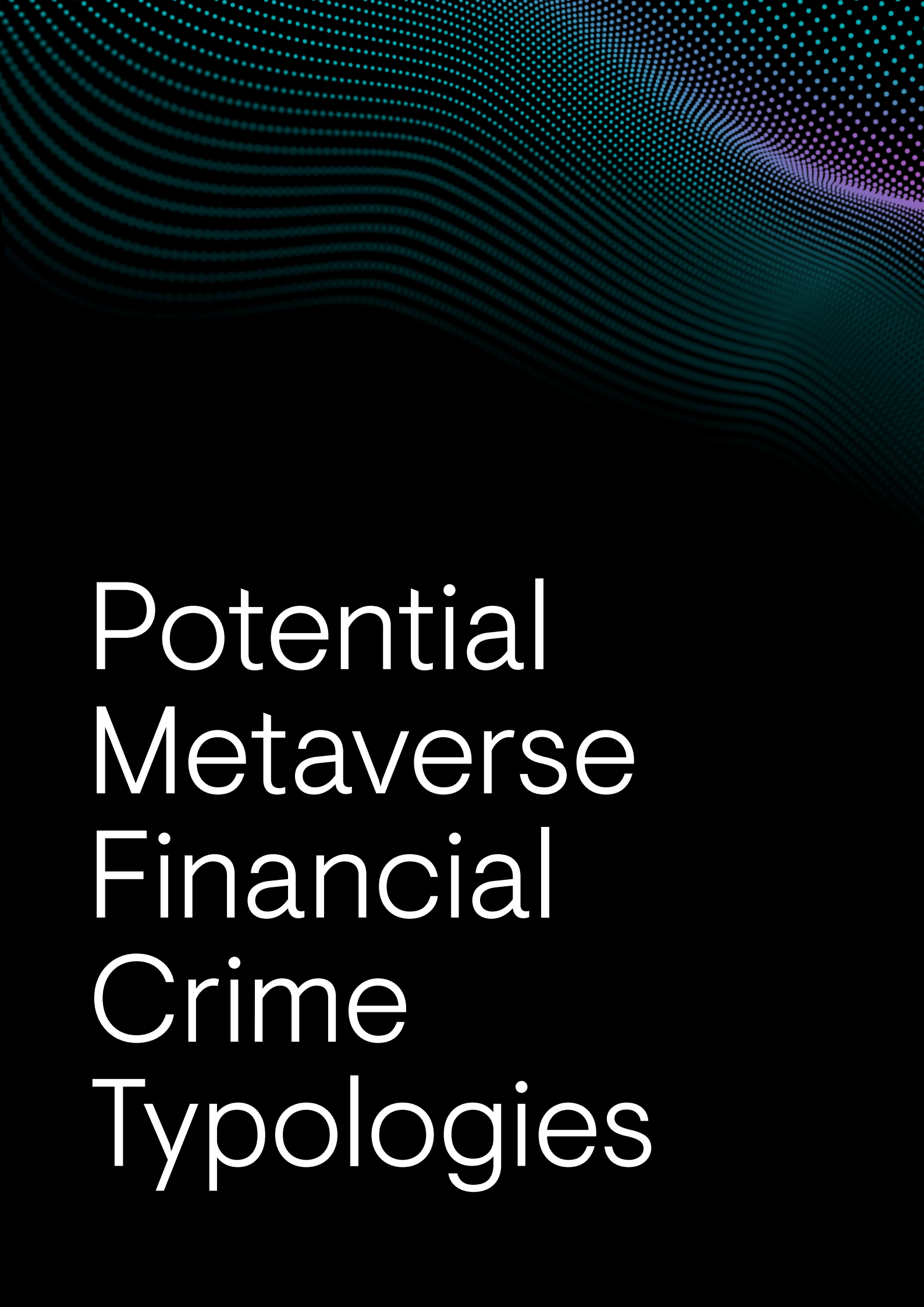
For Decentraland this is MANA, for The Sandbox it's SAND, and for the recently announced but yet to launch Otherside – from Bored Ape Yacht Club – it will be APE. We refer to these as the native currencies of the metaverses and all currently exist as ERC20 tokens on the Ethereum blockchain, with MANA also available on the popular layer-two scaling solution Polygon.

However, as with any new innovation, there are already those who are exploring what role land, wearables and native metaverse cryptoassets can play in their illicit activities.

Top Metaverse Tokens by Market Capitalization June, 2022

Name	Price	24h %	7d %	Market Cap ¹	Volume(24h) ¹	Circulating Supply ¹
 Decentraland MANA	\$0.8164	▲ 9.25%	▼ 2.23%	\$1,507,616,632	\$235,697,187 289,103,790 MANA	1,849,227,341 MANA
 ApeCoin APE	\$4.13	▲ 27.86%	▼ 2.79%	\$1,237,212,776	\$436,905,757 105,775,603 APE	299,531,250 APE
 Theta Network THETA	\$1.22	▲ 12.62%	▲ 5.08%	\$1,223,163,233	\$78,808,104 64,429,752 THETA	1,000,000,000 THETA
 Axie Infinity AXS	\$13.87	▲ 13.25%	▼ 10.17%	\$1,129,209,320	\$123,157,988 8,894,339 AXS	81,550,296 AXS
 The Sandbox SAND	\$0.8437	▲ 11.62%	▼ 16.32%	\$1,062,596,224	\$275,097,445 325,847,967 SAND	1,258,626,081 SAND
 Stacks STX	\$0.3515	▲ 7.98%	▼ 20.09%	\$464,396,395	\$11,808,100 33,550,540 STX	1,319,496,781 STX
 Enjin Coin ENJ	\$0.4392	▲ 12.60%	▼ 15.35%	\$393,727,209	\$64,889,532 147,569,391 ENJ	895,399,956 ENJ
 Ontology ONT	\$0.2208	▲ 12.72%	▼ 11.46%	\$193,388,175	\$26,382,951 119,405,777 ONT	875,249,524 ONT
 WAX WAXP	\$0.08555	▲ 10.91%	▼ 13.93%	\$180,011,054	\$10,876,509 126,720,743 WAXP	2,097,284,627 WAXP
 PlayDapp PLA	\$0.3272	▲ 8.77%	▼ 23.78%	\$137,891,672	\$20,425,613 62,724,343 PLA	423,447,002 PLA

Source: <https://coinmarketcap.com/view/metaverse/>

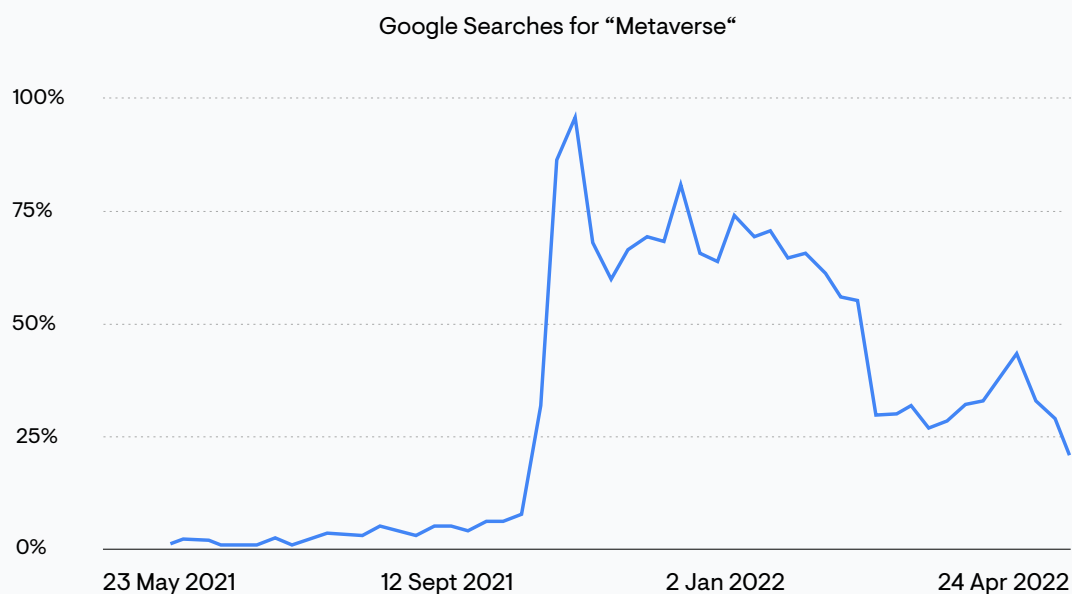


Potential Metaverse Financial Crime Typologies

Wherever there are concentrations of value, there will be crime – and the metaverse is no exception.

Citibank predicts that the metaverse will be worth up to \$13 trillion²² by 2030. At the time of writing, the top five metaverse native assets are seeing 24-hour volumes of almost \$4 billion²³ and seven-day virtual land sales total \$2.94 million²⁴ across just Decentraland alone (although market volatility since the creation of this report has now led to reduced figures across the board). Google searches for “metaverse” have also seen a notable uplift since the tail end of 2021²⁵.

While the reality for many businesses is that the precise opportunities offered by the metaverse have yet to become clear, when Elliptic surveyed our own customer base and members of the crypto community we found that just 14% of respondents saw no commercial opportunities for their business within the next five years from the metaverse.



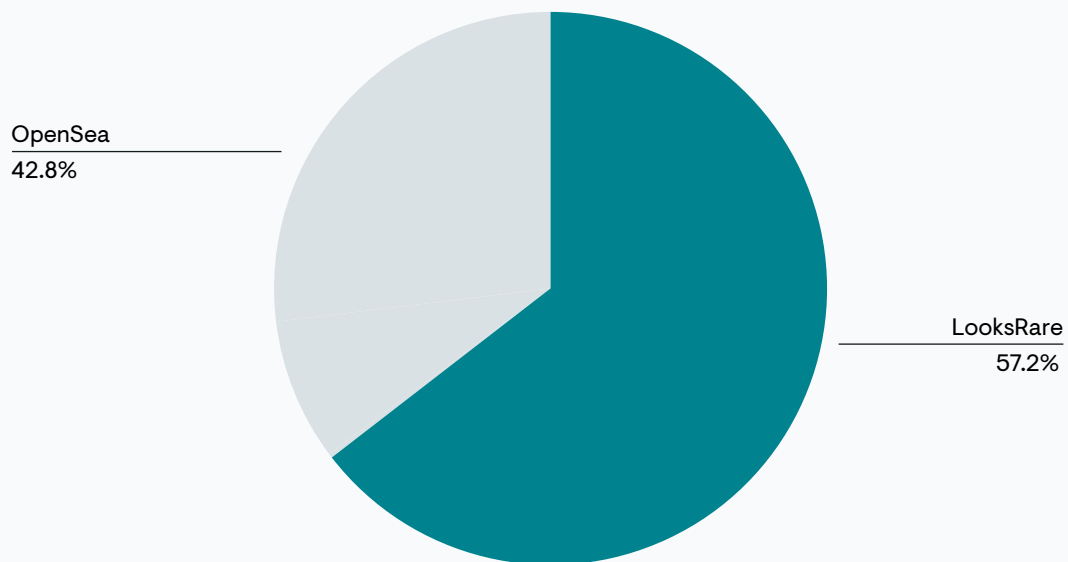
While there is still much discovery to be done, there is a clear indication of significant interest and expectation in the metaverse as a revenue driver and as an investment opportunity for crypto-friendly businesses.

We therefore believe that the metaverse could be an attractive liquidity pool for money launderers and a potential new vector for scammers.

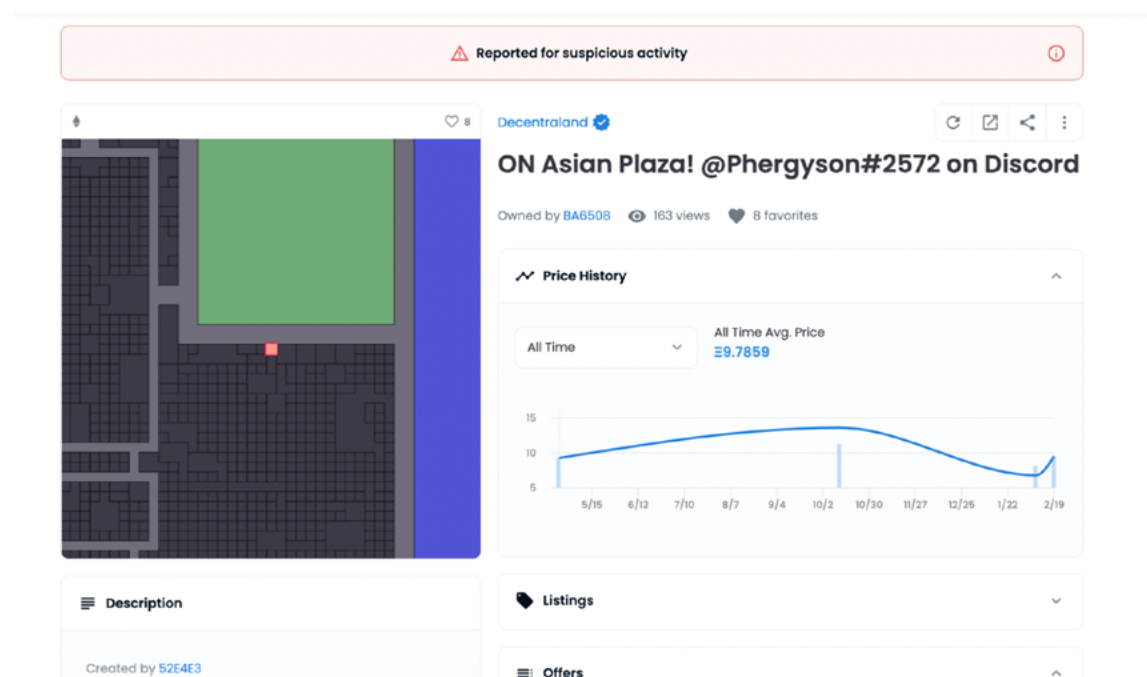
From analysis of Elliptic’s data set, we can already see that there is illicit activity linked to the metaverse-related assets MANA and SAND. Of this illicit activity, 99.5% is linked to cryptoasset thefts – highlighting the most common criminal activity at present. This mirrors wider criminal activity across NFTs where social engineering, fake giveaways and MetaMask browser wallet attacks can create a dangerous environment for those buying, selling and transferring NFTs. We have also observed illicit metaverse native asset-related activity linked to scams, phishing and malware.

In addition, we have detected a number of Decentraland land sales linked to scams and thefts, which are split almost evenly across the NFT marketplaces OpenSea and LooksRare. These were driven by land stolen from MetaMask and phishing attacks on the popular NFT marketplace OpenSea.

Decentraland Land Scams by Marketplace



One such example is²⁶:



In the second section – “Potential Metaverse Crime Typologies” – we explore what avenues illicit actors might look to leverage in order to conduct financial crime, as well as exploring case studies of existing metaverse-related crimes. We will provide guidance on what individuals and businesses in the crypto ecosystem can do to protect from these emerging risks. This is especially relevant since Elliptic’s survey on metaverse crime found that 66% of respondents are actively assessing metaverse-related risks as of May 2022, or plan to in the future, but only 36% of respondents are currently comfortable or very familiar with the concept of the metaverse. In addition whilst there are early efforts for industry players to collaborate on interoperability and technology standards - such as the newly formed Metaverse Standards Forum including tech giants Meta, Sony, Unity, and the World Wide Web Consortium, there is currently no regulation or standards for protecting against metaverse-based crimes²⁶.

This guide deep dives into financial crime typologies using metaverse-related cryptoassets, in order to arm compliance teams with a comprehensive set of warning signs and case studies on:

- Illicit activity involving cryptoassets in the metaverse.
- Examples of how these indicators fit into broader criminal behaviors.
- Context on how criminals engaged in these activities are working to clean their illicit funds.



Red Flags & Warning Signals

Warnings describe significant issues and trends in criminal behavior that are worth highlighting and can indicate suspicious activity, while red flags are indicators of risk that might not clearly pinpoint illicit activity as a standalone.



Diagrams and Flowcharts

Illustrations, diagrams, graphs and charts are included throughout to help you visualize a typology and, where possible, give a relative view.



Case Studies

Wherever possible, real-life examples of how criminals are exploiting the typologies Elliptic has examined are included to evidence how the typology is played out.



Key Controls

These summarize solutions that compliance officers in Elliptic’s network have devised to manage exposure to certain risks to demonstrate mitigating actions that have been effective.

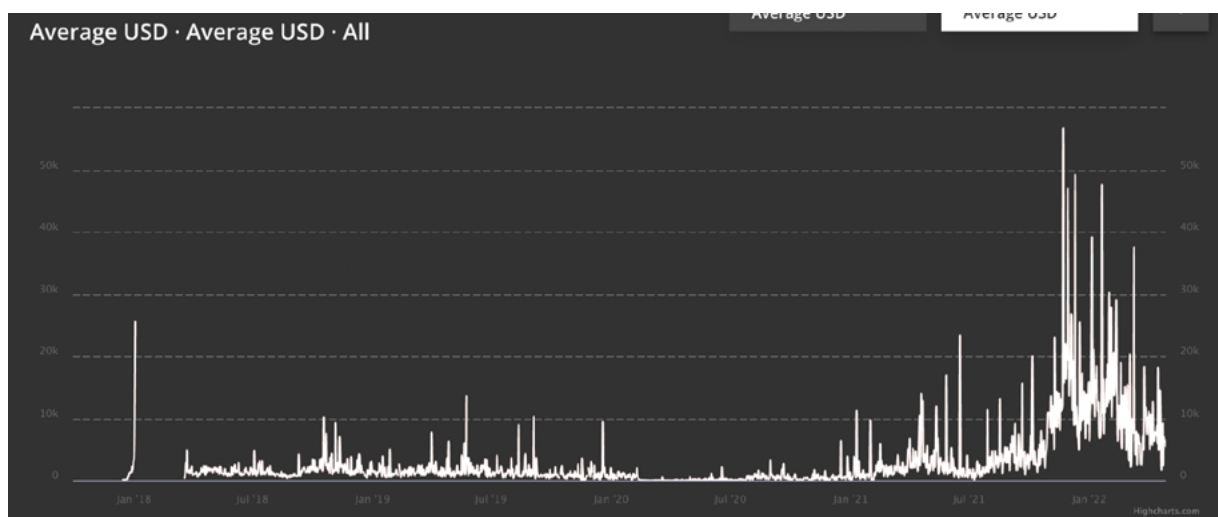
Money Laundering

As we have seen with decentralized finance (DeFi) and NFTs, it is likely that as awareness and adoption of the metaverse continues to grow, illicit actors will look to leverage it as a channel to launder illicit funds. These assets may come from real-world activities or from other crypto-based crimes, and criminals could look to hide their source by exchanging them for metaverse based-assets such as land, wearables or native metaverse cryptoassets.

In 2021, total sales of all cryptoassets – including land – across Decentraland, Cryptovoxels, The Sandbox and Somnium Space surpassed \$500 million²⁷, and this is expected to double in 2022. Therefore, the metaverse is looking like an increasingly attractive liquidity venue for criminals looking to launder assets.

With plots of land selling for millions of dollars²⁸, average land prices in Decentraland reaching tens of thousands of dollars through 2021 and The Sandbox seeing weekly volume since December 2021 of over \$70 million²⁹, we can see a potential route for significant volumes of illicit funds to be moved.

Average Value of Daily Transactions on Decentraland



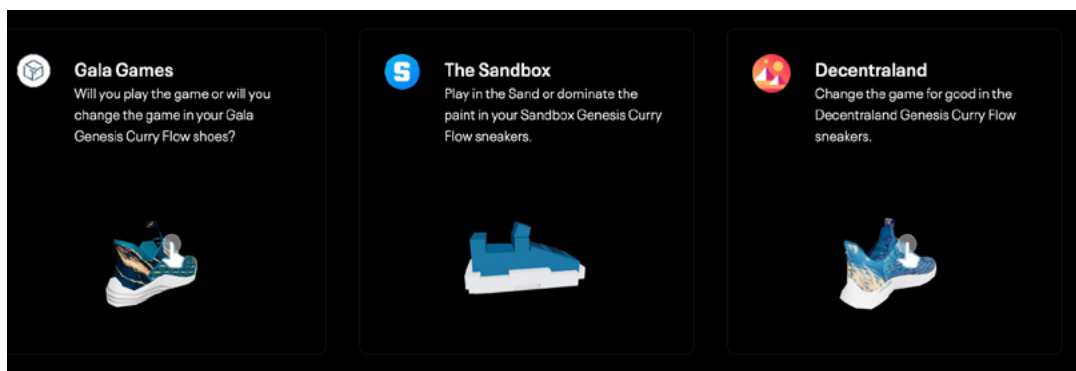
Source: <https://nonfungible.com/market-tracker/decentraland>

An additional risk factor is that unlike in the real world – where purchasing a property or land involves reams of documentation and solicitor-led checks – purchasing metaverse land can be done with little more than a cryptoasset address and some funds. Unlike mainstream cryptoasset exchanges, know-your-customer (KYC) checks are not typically required to purchase products on metaverse marketplaces, and the same applies to secondary marketplaces, which in some cases facilitate multi-million pound transfers of virtual property. However, a notable exception to this was the Otherside metaverse land launch from Yuga Labs, which required prospective land buyers to complete KYC checks ahead of the public land sale.

An illicit actor looking to launder funds through metaverse land would be able to purchase plots or developed estates and re-sell through a secondary market or directly to another actor, in order to then demonstrate that the source of their income was through a metaverse land sale.³⁰



It's also possible that illicit actors may look to use wearables to launder the proceeds of crime. That said, there is a less liquid market for these assets due to the infinite number of wearables which can be created and many items being an identical piece from a 10,000 batch – therefore lacking scarcity. Furthermore, similar to NFTs, it's challenging to predict which pieces will resell at a profit. At Elliptic, we have already conducted research³¹ into the impact of rarity on NFT resale prices and continue to build out our expertise as NFT trends in the metaverse take shape. In addition, the volume of wearable sales is much smaller than land with less than \$5,000 worth of wearables sold in Decentraland in the last seven days at the time of writing, and the average wearable price being under \$100³². That said, there have been standout pieces such as a Decentraland bloody knife which sold for nearly \$12,000³³, Coca Cola's Bubble Jacket which is on sale for almost \$1.5 million³⁴, and a super yacht on The Sandbox which sold for over \$650,000³⁵. Therefore, the average price of wearables



currently makes them limited in use for large-scale money laundering. Though this may all change, as the metaverse wearable market is predicted to reach \$3 trillion by the end of 2023³⁶.

A risk factor with wearables – which doesn't exist with metaverse land – is interoperability, whereby collection creators are making wearables which can exist across multiple metaverses. The opportunity here is that a bad actor can purchase a wearable in one metaverse, and then move it to another where they cash out via a secondary sale and thus make the flow of funds harder to trace, since it's across multiple blockchains.

Finally, when considering money laundering risks in the metaverse, it is worth considering the risk that an illicit actor may use the metaverse's native asset. This can be done using the same techniques as money laundering through non-metaverse related cryptoassets. Bad actors could look to deposit metaverse native

assets into an exchange, often using obfuscation techniques such as sending from a mixer, utilizing CoinJoin transactions to mix inputs with other transactions, or attempting to move the funds through multiple “hops” in order to try to hide the source of the funds. They could also look to leverage decentralized exchanges, which largely do not require any KYC information or apply compliance checks to transactions.

Protecting Against Money Laundering Risks

Red Flags and Warning Signals

In order to mitigate risks of money laundering through metaverse-related assets, secondary marketplaces, exchanges and others can perform compliance screening on the accounts sending/receiving funds to ascertain any money laundering risks.

This will ensure that any attempt to use an obfuscation technique or service is flagged, and any other money laundering risks can be found.

This is possible since the underlying assets are predominantly ERC20 and ERC721/ERC1155 (NFT) tokens on the Ethereum blockchain, so you can use blockchain analytics solutions to understand the source and destination of the funds.

However, as illicit actors will often look to operate across many different assets – and interoperability across chains grows – it is also important to have a holistic view of the risks of a single metaverse as well as across multiple metaverses. This can ensure that a nefarious actor is not trying to hide “dirty” money in one asset or metaverse and “clean” it through another. As such, when screening metaverse-related assets or transactions, being able to see the results across multiple blockchains and/or metaverses can help to build up this picture.

Wash Trading

Wash trading is the action of selling an item to yourself or a collaborating actor with the intention of inflating the price or making the perceived volumes look larger. This type of illicit activity has been seen across the crypto markets for a number of years. Indeed, many exchanges have been accused of inflating their volumes via wash trading, with a reported 95%³⁷ of all activity on NFT marketplace LooksRare being attributed to it and an estimated wash trading volume of up to \$8 trillion globally in 2021³⁸.

With rampant wash trading in other crypto markets, it's clear that this could be a growing avenue for illicit actors to leverage with metaverse-based assets – whether in an attempt to bolster market sentiment of native metaverse assets or to try to secure a higher sale price for wearable and land sales.

Exploring a number of land trades for Decentraland parcels and estates, there appears to be some questionable activity which looks like it could be wash trading. However, it is very challenging to definitively give a figure for wash trading across metaverses.

When looking at the top 250 NFT projects by 30-day sales³⁹ and filtering for metaverse-related projects, there is a reported \$29.9 million worth of wash trading activities. Though this represents just 3.33% of total monthly sales on these platforms.

Wash trading as identified by crypto data aggregator CryptoSlam

Project	30 day Trade \$	30-day Wash Trade \$	30-day Trade Number	30-day Wash Trade Number	Link
Crypto Unicorns Land Market	\$3,906,976	\$ 208	4521	1	https://cryptoslam.io/crypto-unicorns-land-market
Arcade land	\$11,909	\$974	14	2	https://cryptoslam.io/arcade-land
Otherdeed	\$892,094,915	\$29,942,300	38162	302	https://cryptoslam.io/otherdeed
Metamon	\$45,918	\$3,521	154	12	https://cryptoslam.io/metamon
Pixlemon	\$2,317,947	\$0.00	2091	0	https://cryptoslam.io/pixelmon
	\$898,377,655	\$29,947,003	44.94	317	
	Wash trade %	3.33	Wash trade %	0.70	

Protecting Against Wash Trading Risks



Red Flags and Warning Signals

When assessing the risks of wash trading in metaverse-related assets, it is important to review the trading volumes against historical trends and compare against wider cryptoasset-related activity.

For example, a new metaverse which is seeing millions of dollars in asset volume but has limited marketing and industry attention is likely to be encountering wash trading activity. Therefore, where there is limited trade history, one should attempt to understand the fundamentals of a price – whether it be land, a wearable or a metaverse native asset. As noted above, there are certain aspects of land and wearables which are already beginning to become universally acknowledged as price drivers – such as proximity to key locations or notability of the collection creator. As such, when assessing whether something appears to be at a fair market price or an elevated one which may be the result of wash trading, assessing these price drivers can be useful.

Mirroring the traditional markets as well as protections for DeFi and wider NFT-related activity, many virtual asset services providers (VASPs) are also putting statistical models and implementing monitoring to help draw out signals for wash trading. This could be building out activity monitoring around the Pareto principle and Benford's law, as well as monitoring trade cadence and counterparties.

The Pareto Principle

The Pareto principle states that for many outcomes, approximately 80% of consequences come from 20% of causes. In other words, a small percentage of causes have an outsized effect. Using this and metrics such as the volume-weighted cap⁴⁰, it's possible to explore expected and reported market dominance for a cryptoasset.

Benford's Law

Benford's law – also known as the Newcomb-Benford law – is an observation that in many real-life sets of numerical data, the leading digit is likely to be small. This can be applied to statistically search for wash trading activity as well as so-called “pump and dump” projects⁴¹.

However, one of the challenges with analyzing metaverse-related activity for suspected wash trading is the boom-and-bust nature of some of these platforms and associated assets. A celebrity land purchase or luxury fashion house wearable drop can drive elevated traffic to the metaverse or secondary market – thus moving trading volume outside of normal market levels. As noted above, the pseudonymous nature of blockchains also means it is difficult to ascertain whether actors involved in a trade are distinct. Though using cluster-based blockchain analysis where actors can be grouped together based on high confidence pattern analysis and transaction history, it is possible to discover any actors masquerading as individual entities but who are actually the same person.

Scams

Unfortunately, a steady stream of scams have emerged thanks to the amount of retail and institutional capital coming into the crypto space – coupled with limited education about keeping funds safe and being able to identify red flags for illicit activity. These range from rug pulls where projects will raise capital and then disappear before delivering any roadmap promises, investment scams which promise guaranteed returns but do not deliver on this or return the invested capital, and giveaway scams where users are falsely promised a multiplied return if they send funds to an address.

In 2021, it was reported that over \$14 billion worth of cryptoassets were stolen due to scams⁴². The assets involved are usually bitcoin and Ethereum-based tokens, since they are the most well known and readily-available assets – especially for those new to the space. From examining our dataset, we have already identified a number of metaverse-related transactions linked to MANA and SAND which have connections to scammers and phishing attempts. These figures are relatively small, especially when compared to illicit activity in the DeFi sector. However, as the concept of the metaverse continues to grow across both the crypto and non-crypto community, it's likely we'll see scammers switch their focus from DeFi and NFT-related scams to more metaverse-specific assets.

Some scam typologies which we may see are:



Giveaway scams: Illicit actors may look to piggyback off the growing interest in native metaverse crypto assets and run giveaway scams for assets such as LAND, SAND and APE.



Fake metaverses: Illicit actors may announce the launch of a new metaverse, likely with social media and marketing to match. Yet no such metaverse will exist, and when users attempt to connect via their MetaMask they will see their account wiped.



Phishing attacks: There has already been evidence of illicit actors attempting to phish unsuspecting users into clicking nefarious links which purport to be from well-known metaverses. As with many other scam types, the danger is a nefarious connection to your MetaMask account and a swiping of your assets.



Wearable minting scam: With the growing popularity of wearables and the fear of missing out on exclusive collections, we may see a similar trend to NFT minting scams, whereby intentionally buggy smart contracts are created which do not distribute a new wearable and instead the minting costs go to the bad actor. This would mirror the Big Daddy Ape Club NFT scam, which saw over \$1.2 million taken from over 9,000 investors⁴³.



Technical support scams: Metaverses – as with any new app, game or software-based product – can require some technical knowledge to set up and use successfully. We may, therefore, see bad actors posing as support staff for metaverses in order to try to trick new users into sharing private keys or connecting their MetaMask wallets to nefarious websites.



ICO/fundraising scams: Over \$1.3 billion in capital was scammed from crypto investors during the 2017/18 initial coin offering (ICO) boom and bust⁴⁴. With new metaverse projects launching and crypto investors looking for their next profitable venture, we will likely see fake projects trying to raise funds through ICOs and various derivatives of them.



Fake land expansions/drops: The majority of metaverses have a limited land supply in order to hold value and create a more exclusive community/ownership model. For Decentraland, this is 90,601 plots of land, with some reserved for community owned spaces, Meanwhile, The Sandbox has 166,464 pieces of land, and Shiba Inu's yet-to-launch metaverse is expected to have 100,000 plots. Though as some of the main metaverses fill up and secondary land sales become more expensive due to scarcity, we may see nefarious actors look to launch fake land expansions of new areas in these principal worlds. In addition, bad actors may try to deceive users into buying fake versions of prominent metaverse land launches.



3D social engineering: Instead of a criminal spoofing a colleague's email address or reaching out via a closely-resembled domain, social engineering in the metaverse will likely take the form of 3D avatars made up to impersonate your co-workers with the aim of getting you to share sensitive information and access.

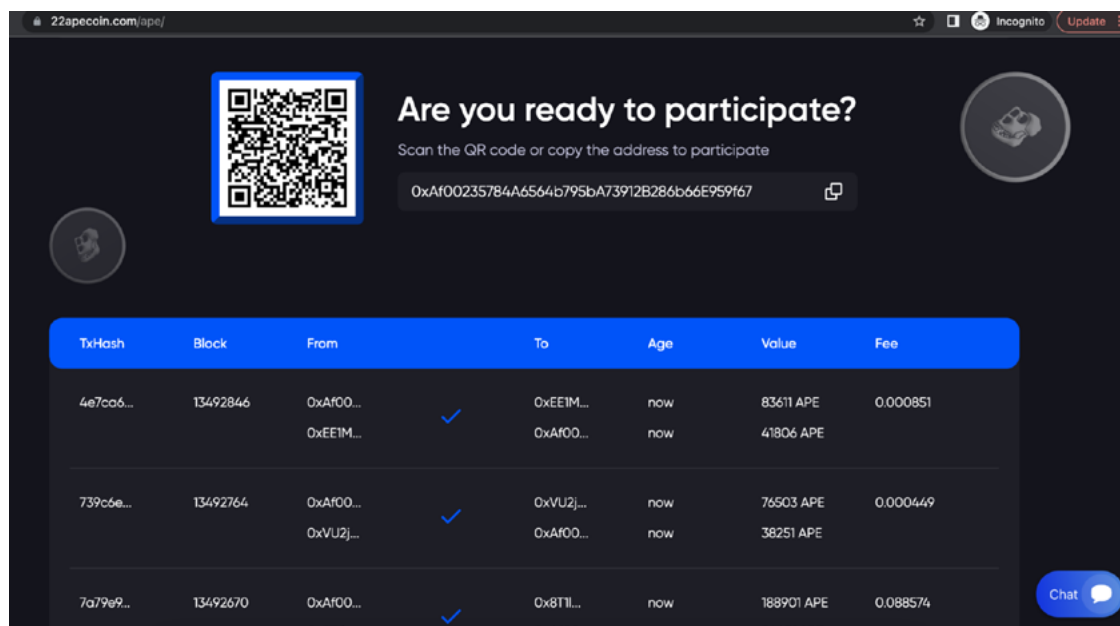
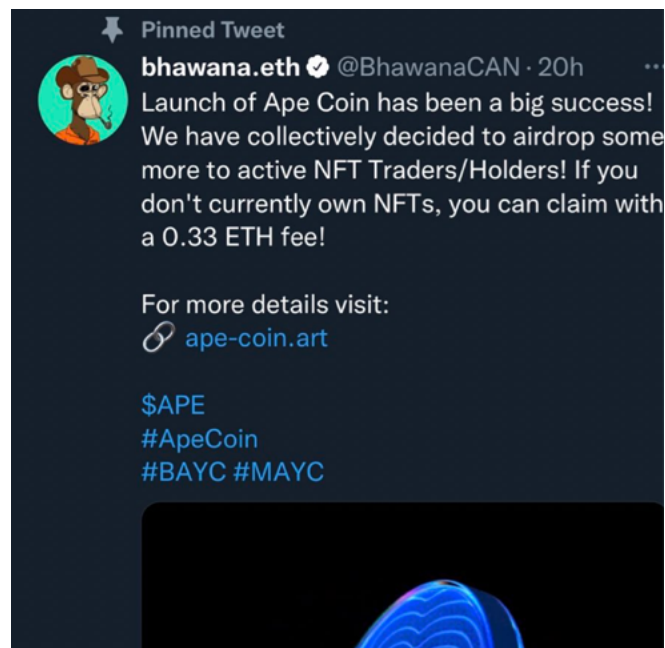


Rug pulls: As we have seen in some NFT projects, the team will raise funds – often through a traditional token sale or via an early minting process – but then either deliver a lower quality project or run away with the money. As more metaverse-related projects start to be advertised, there will be a risk that malicious actors intend to rug pull investors rather than deliver on the promises of the project and roadmap.



CASE STUDY A

There have already been examples of fake airdrops and giveaway scams for metaverse-related assets. In March 2022, when the Yuga Labs team announced the launch of MetaRPG and the native cryptoasset ApeCoin (APE), a number of bad actors on social media platforms tried to trick users into clicking malicious links or sending funds for fraudulent giveaways. Unfortunately, they managed to raise around \$900,000.





CASE STUDY B

There have already been attempts to mislead Decentraland users into clicking on phishing links instead of the official domain. The danger of this is because the majority of users will connect via their MetaMask – since it gives an enhanced experience with a persistent avatar – using a nefarious link could allow an illicit actor to steal funds via this connection.

A promising step by Google has been to disable ads on Decentraland-based searches. However, other search engines may not do the same, and attackers will likely look to leverage fake ads on other platforms such as social media and other crypto/investment-based websites.

In response to this, the company behind Decentraland has been working with a number of IP protection firms and has already taken down two websites, 24 domains, and five social media accounts⁴⁵.

Ad · <https://www.decentarland.com/> :

Decentraland - Welcome to Decentraland

Decentraland is a virtual world where users can buy, develop, and sell Land. Gallery. Create, explore and trade in the first-ever virtual world owned by its users.

People also search for

decentraland game	decentraland reddit
decentraland (mana price prediction)	decentraland casino
where to buy decentraland	decentraland rarible
decentraland news	is decentraland a good investment

Ad · <https://www.decentrelond.net/> :

Decentraland 3D VR World - Decentraland Virtual World

Decentraland is controlled via the DAO, which owns the most important smart contracts. Using our service you can always get the most favorable conditions.

Ad · <https://sandyruddy8.jimdofree.com/> :

Builder - Welcome to Decentraland - jimdofree.com

Create, explore and trade in the first-ever virtual world owned by its users. **Decentraland** is a virtual world where users can buy, develop, and sell LAND.

Ad · <https://www.decentarland.org/> :

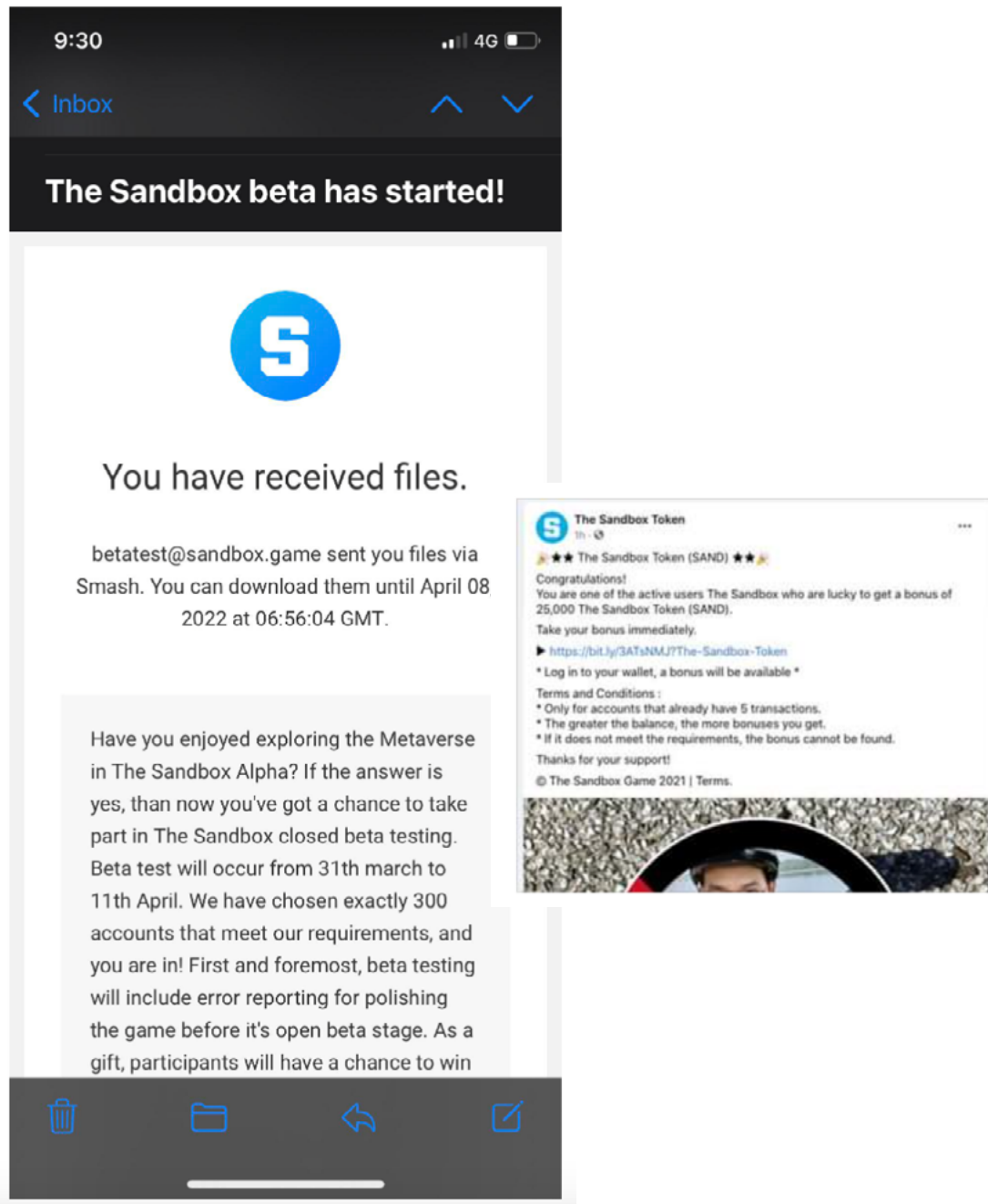
Explore With Decentraland - Own & Manage Virtual Lands

Own parcels and Estates, wearables with **Decentraland** and unique names that are for sale. You can get exclusive wearables in the **Decentraland** Marketplace from different events.



CASE STUDY C

The Sandbox has already been hit with a number of fraudulent websites purporting to sell land for the season two release⁴⁶, as well as fake airdrops of the native LAND token for active users⁴⁷. As such, bad actors look to leverage excitement about project developments and tap into the loyal community, who are keen to benefit from their gameplay.





CASE STUDY D

In February 2022, an NFT project named Pixelmon raised \$68 million in a series of auctions and a minting campaign. The project claimed to be a 3D online game where holders of NFTs could interact with the creatures within those NFTs. After the assets were unveiled in late February, they were revealed to be of significantly lower quality than what was previously advertised on the project's social media. Their floor price crashed instantly from 1.3 ETH to 0.3 ETH, with many investors accusing the project of a rug pull.

The project's development team released an apology on its Discord channel, claiming that the "reality is that we weren't ready to push the artwork". Around the same time, 400 ETH was sent from the Pixelmon contract to a developer's wallet, which then began purchasing several blue chip NFTs with the funds. The Pixelmon Twitter account, while still online, ceased all activity following the botched unveiling. Overall, \$13 million of the raised \$68 million has been sent out from the project's contract at the time of writing, though the project's Discord server remains active and has not been confirmed as a rug pull.



The pre-released trailer showing what the Pixelmon project would look



The eventually released NFTs (right)



CASE STUDY E

Trying to capitalize on the popular Otherside land sale, some bad actors created and promoted fake Otherside contracts in an effort to trick users into minting land. They also minted land and sent it to prominent NFT collectors such as SnoopDogg's Cozomo de' Medici account, Pranksy and Ethereum merge coordinator Tim Beiko in an effort to appear legitimate. This is a tactic often deployed by projects in an attempt to boost awareness and trick community members into thinking that popular crypto personalities have endorsed the project.

Token `0xa4c8a13fee3b19718e45d678c071bdc3e33a7302`

Buy Exchange Earn Gaming

Sponsored: bc.game - Win up to 1 BTC Everyday! Live casino + 20k slots [Play Now](#)

This token is reported to have been spammed to a large number of addresses. Please treat it with caution.

Overview (ERC-721)

Max Total Supply:

25 ERC-TOKEN

Holders:

176

Transfers:

384

Profile Summary [Edit](#)

Token Name:

BAYC Otherside Land

Contract:

[0xa4c8a13fee3b19718e45d678c071bdc3e33a7302](#)

Social Profiles:

Not Available, [Update ?](#)

Token `0xd1b799f154265845322f63bea9b0f8de19b84a24`

Buy Exchange Earn Gaming

Sponsored: 1inch - The most efficient DeFi aggregator on Ethereum. [Swap your tokens with the best rates now !](#)

This token is reported to have been spammed to a large number of addresses. Please treat it with caution.

Overview (ERC-1155)

Max Total Supply:

0

Holders:

N/A

Profile Summary [Edit](#)

Token Name:

BAYC Otherside Land

Contract:

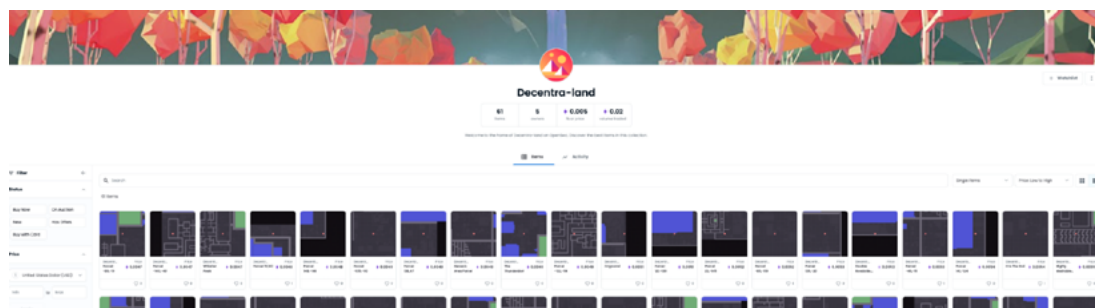
[0xd1b799f154265845322f63bea9b0f8de19b84a24](#)

Social Profiles:

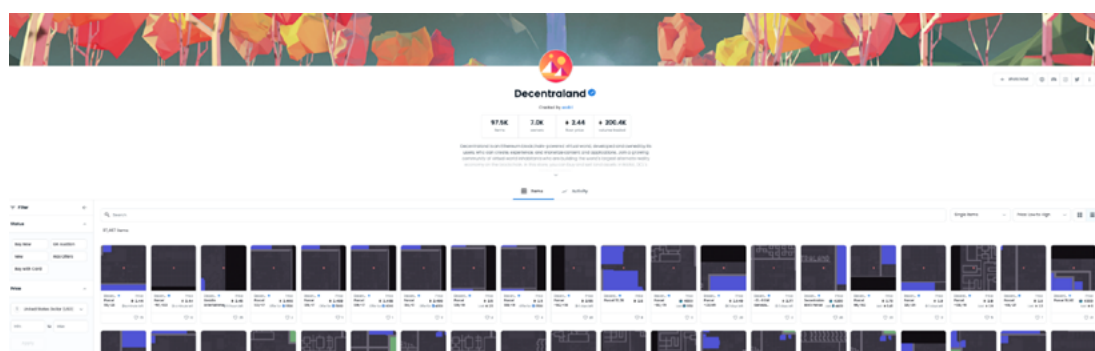
Not Available, [Update ?](#)



CASE STUDY F



The image ¹⁴⁹ above shows a copycat Decentraland project attempting to mislead users into thinking that it is the official platform. You'll note that it uses the same banner and individual land images. But by checking the collection name matches the official name of the project – Decentra-land vs Decentraland – making sure the verified checkmark is present and ensuring any volume and price stats are in line with expectations and wider market values can help protect you from falling prey to these scams. In addition, in May 2022⁵⁰, OpenSea announced a number of planned actions to help remove copycat projects from the marketplace. Such checks included AI and human-based checks for copyminting – where a project makes small modifications like changing colors or flipping the image – and increasing the requirements for the blue check verification mark.



Sanctions and Terrorism Funding

There has, understandably, been much concern about whether cryptoassets in general have been or will be used to help nation states and bad actors evade sanctions or fund terrorism. Therefore, as metaverse related activity grows, there will be concern about its potential use for this illicit activity. There could be a number of channels which these types of actors look to explore:

Using Metaverse-related Cryptoassets to Fundraise for Terrorism or Evade Sanctions

One potential avenue which sanctioned actors – especially those linked to terrorism – may look to explore is fundraising via metaverse-related assets. However, the likelihood of this appears limited, as all terrorist crypto-fundraising efforts Elliptic has observed so far have been primarily in bitcoin (BTC), with a comparatively small amount being in other cryptoassets. This is likely due to wider familiarity with bitcoin versus other cryptoassets, and the widest support on fiat on-and-off ramps like crypto exchanges – therefore making it the easiest cryptoasset for sympathizers to buy and send.

An additional concern is sanctioned actors or nation states using metaverse-related assets in an attempt to evade sanctions. However, with the top five metaverse native assets seeing 24-hour volumes of \$1.6 billion⁵¹ and Russia's banking sector alone being worth \$1.4 trillion, it's clear that metaverse-related assets simply don't have the liquidity to support a nation state's required volume⁵².

Also, when assessing accounts on the Ethereum blockchain which have been OFAC-designated as relating to terrorism or sanctions activity, Elliptic has found no evidence to suggest that these actors have sent or received the metaverse-related assets MANA or SAND. This suggests that terrorist fundraisers and sanctioned nation states have not started to use to these specific metaverse related assets – despite their growing popularity.

Sanctioned Actors Purchasing Metaverse Land

Another concern is that sanctioned actors may look to purchase land in the metaverse in order to store or transfer illicit wealth. They could potentially seek to use the higher price tag for land versus other metaverse related assets such as wearables and native cryptoassets, as well as the ease at which it – like other blockchain-based assets – can be transferred globally.

However, when assessing the Decentraland LAND contract, there is no evidence to suggest that sanctioned actors are buying native land assets in the metaverse. So, while there is plenty of evidence that sanctioned actors use physical real estate to move and store their money, it appears that this has not translated into metaverse activity yet.

A non-financial risk – but one worth noting – is the potential ability for sanctioned entities and broader illicit actors to use the metaverse as a meeting point to communicate in. Many metaverses have chat functionalities that allow users to “follow” or “befriend” others. Therefore, this could allow groups of illicit actors to share information outside the view of law enforcement, which may be only watching the

traditional communication channels. This could be potentially attractive to sanctioned actors, since law enforcement spends significant time trying to intercept communication channels on social media platforms, web messaging services and mobile messaging apps, but they may not yet be following metaverse-related activity.

As noted above, there is no evidence yet to suggest that sanctioned actors are directly interacting with some of the high-profile metaverse-related assets. However, there are a number of examples where sanctioned related addresses have interacted with other metaverse-linked assets.



CASE STUDY G

One account which we suspect to be connected to the Ryuk ransomware hack holds a metaverse-related NFT and has interacted with Ether and a number of ERC20 tokens. Ryuk is ransomware attributed to the hacker group WIZARD SPIDER, which likely netted a total of \$150m by the end of 2020⁵³. While not sanctioned itself, Ryuk and other ransomware activities are often operated by sanctioned entities and nation states – bringing heightened sanctions risks.

This NFT provides the holder with the ability to access Digitible, an office in Decentraland which apparently contains a petition to free the controversial Silk Road darknet marketplace founder Ross Ulbright. However, access into the building is restricted only to holders of these NFTs, so it isn't possible to go inside. It's unclear why this account received the NFT and if they have used it to gain access into the Digitible space.





When assessing accounts on the Ethereum blockchain which have been OFAC-designated as relating to terrorism or sanctions activity, Elliptic has found no evidence to suggest that these actors have sent or received the metaverse-related assets MANA or SAND since the assets were created. This suggests that terrorist fundraisers and sanctioned nation states have not started to use these specific metaverse related assets – despite their growing popularity.

**Tara Annison, Head of Technical
Crypto Advisory, Elliptic**



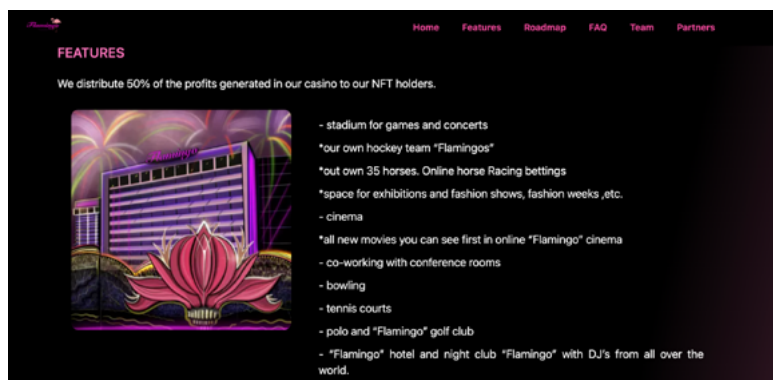
CASE STUDY H

An account linked to the ransomware group REvil⁵⁴, a hacker collective thought to be based in Russia and responsible for the Colonial Pipeline hack, bought a LandVoucher⁵⁵ for land in the Matrix metaverse. This is not for the native metaverse currency, but a certificate for the digital land you can buy and build on in the Matrix metaverse. They bought this for 0.35 ETH – worth around \$1,500 – before transferring it over to a new owner around one month after purchase. It is not clear why they purchased the LandVoucher, or if the person they transferred it to was connected to them or not, but it does indicate activity from a known sanctioned and high-profile entity in a metaverse.



CASE STUDY I

In May 2022, regulators across five US states – Alabama, New Jersey, Texas, Kentucky and Wisconsin – issued an emergency order for the Flamingo Casino Club (FCC) to halt the sale of its NFT collection. The regulatory action is not just citing security registration violations, it also alleges deceit and fraud with obscured ties to a Russian organization. NFT holders were being promised access to a share of profits from a planned metaverse casino in The Sandbox. Other offers included entry into a lottery with prizes of cash, iPhones, Tesla cars and access to a metaverse space it claimed would have a cinema, bowling alley and online horse racing with their own horses.



The 33 holders of the FCC NFTs are therefore exposed to a potential sanctions violation with the ongoing actions against Russia for the war in Ukraine and international scrutiny in financial dealings with Russian citizens and businesses. But this exposure is minimal, with a total of just over \$2,000 being spent on minting the NFTs and no contributing addresses having illicit links themselves. The project's Twitter account has not tweeted since April 14th⁵⁶, and since being uncovered, OpenSea has delisted the NFTs⁵⁷ and the FCC's Discord has been taken offline.

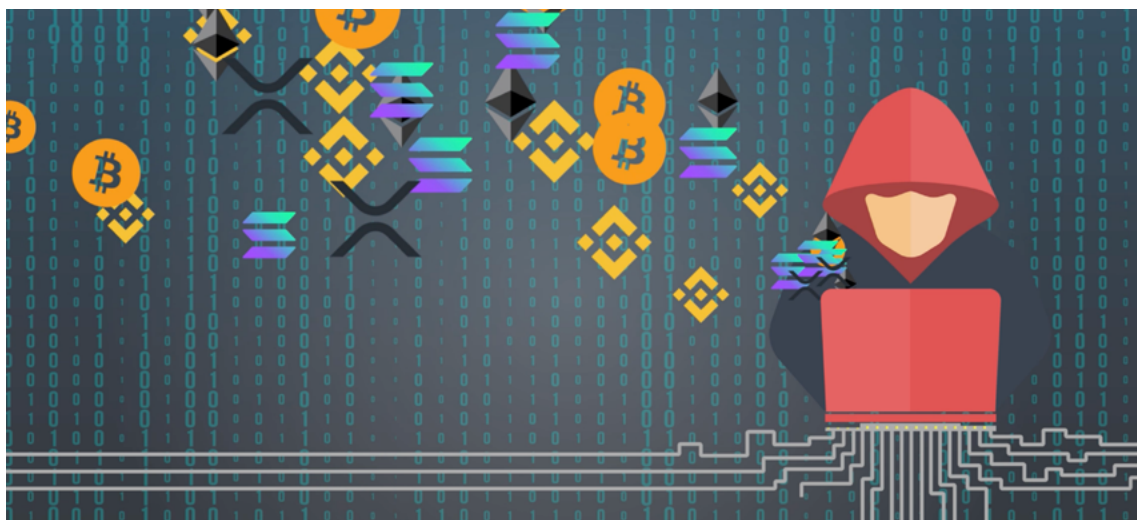
Protecting Against Sanctions Risks

Red Flags and Warning Signals

While it's unlikely but not infeasible that sanctioned nation states or actors would look to leverage developments in the metaverse in any significant way, it is of course a risk that should be monitored.

It is, therefore, important to be screening metaverse assets for sanctions-related activity – whether it is land, wearable purchases, metaverse-native assets or related assets which brands may be using or developing for the metaverse. This will help ascertain whether any sanctioned actors are attempting to violate restrictions and allow further mitigating or reporting actions to be taken. The Elliptic Navigator and Lens tools allow you to screen transactions and wallets for sanctions-related risks and support a number of metaverse related cryptoassets in order to help manage your compliance risks in the space.

For an in-depth report and guidance on effectively managing sanctions-related risks, we published the 2022 report “Sanctions Compliance in Cryptocurrencies: Using Blockchain Analysis to Mitigate Risk”⁵⁸.



Click to watch the Elliptic explainer video on the role of crypto in sanctions evasion

Code Exploits

Many of these metaverses exist as a complex web of smart contracts – self-executing code on a blockchain. As such, the assets represent non-fungible token standards such as ERC721 and ERC1155 and native assets may be ERC20s. The interactions between these assets and the services in the metaverse may be facilitated by any number of bespoke smart contracts governing how these interactions can take place.

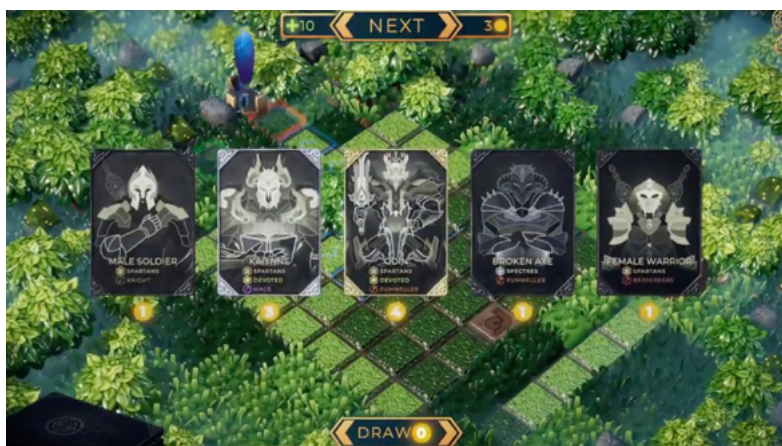
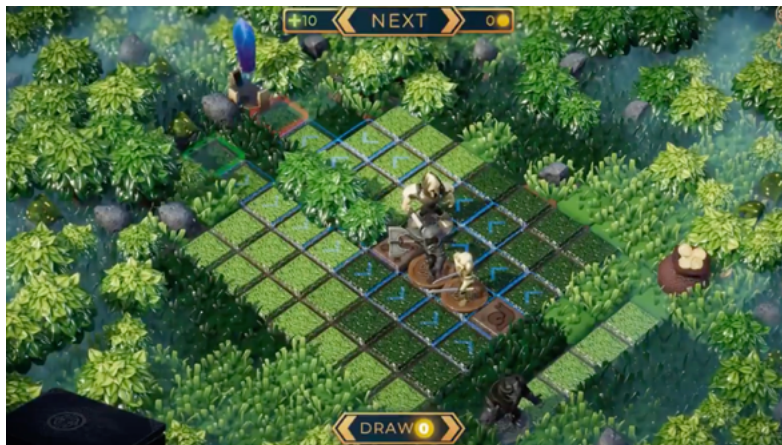
Yet as we have seen across the DeFi space, bad actors will look to exploit poorly-constructed contracts or weaknesses between contracts in order to steal funds. This will likely be no different in the world of metaverses made up of smart contracts, and there are already examples of code exploits in metaverse-related projects.



CASE STUDY J

In September 2020, a Yearn Finance developer began working on an NFT game called Eminence Finance, which also came with its own token (EMN). Despite no information on the project, investors spotted the token and minted \$15 million worth of EMN in a matter of hours. They did this using a smart contract intended to allow players to swap DAI – a stablecoin – for EMN to fund in-game purchases.

However, an exploiter then identified a way of draining the contract of the funds using a flash loan, which sent the token's price plunging. A flash loan is a means of borrowing funds – typically used for arbitrage – that must be repaid within the same block. The hacker refunded \$8 million of the stolen funds back to Eminence's developer. The game has still not been released at the time of writing.



In other cases, scammers may use technical bypasses – similar to code exploits – to override private key checks in smart contracts. These allow hackers to utilize administrative privileges despite not being developers.



CASE STUDY K

On August 21st 2021, exploiters managed to gain access to the NFT minting contract of the NFT Gods metaverse gaming protocol on the Binance Smart Chain (BSC). They managed to bypass private key checks using technical means to steal almost nine million LG tokens – the platform’s native asset. They were then able to sell these tokens for \$1.45 million through cryptoasset exchange services which don’t require KYC checks. Due to the devaluation of LG tokens, the protocol abandoned them as their native asset and created a new token contract.

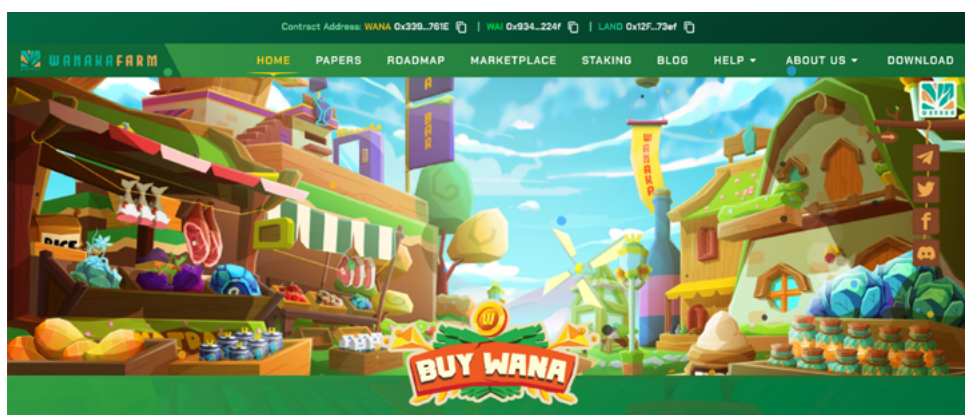


CASE STUDY L

Wanaka Farms is an NFT-based metaverse gaming platform on the Binance Smart Chain (BSC). Launched on 29 October 2021, its backend API was exploited on November 11th.

The exploiter began by depositing WANA – the platform’s native token – to the game’s smart contract and then initiated a withdrawal. Since the API was too slow in checking whether a withdrawal had already been made, the exploiter was able to withdraw the same deposit six times before the site would give an error. The exploiter essentially multiplied their WANA by a factor of five before repeating the process with a new wallet. The exploiter had created 1,000 wallets – though it is unknown if they were all used⁵⁹.

The exploiter accumulated at least 431,000 stolen WANA and began selling some to make over \$300,000 before the token price collapsed.



Images taken from official twitter account promo video:
<https://twitter.com/eminencefi/status/1493276351364669444>

Protecting Against Code Exploits

Red Flags and Warning Signals

In order to protect against code exploits, it's best to utilize metaverse-related projects where any smart contract code has been audited and any centralized services can provide evidence that it provides security testing and follows security best practices.

In addition, a metaverse with a technically strong and reputable development team behind it could help to reduce the risk of code exploits. However, if the team are anonymous then this may be considered as a red flag from a code safety perspective, as well as for various scam risks such as rug pulls. It's also important that the team has a good level of decentralization in terms of project ownership and any private key management and funds. Otherwise, this could make them susceptible to insider attacks or vulnerable to outside pressure to access any of the project's metaverse-related assets.

Outside of the more traditional financial crime typologies, there are further risks for illicit behavior in the metaverse which we could see develop.

Illegal Shops and Services

It comes as no surprise that the metaverse is first used by early adopters and technology curious businesses, since this mirrors other technology developments in both the crypto and non-crypto ecosystems. Already there are common trends for the types of experiences these pioneers are creating in the metaverse with NFT art galleries, topic-based museums and project social spaces being popular, as well as hybrid shops allowing users to purchase in the metaverse and receive in the real world. This was further popularised in the recent Decentraland Fashion Week during March 2022 where digital rendering of clothes and accessories in Boson Protocol's marketplace could be bought and delivered to your home in the real world. However where these early metaverse shops are primarily being used for virtual sneakers and dresses, bad actors in the space may look to leverage them to sell illicit goods and services.



*The author by a sneaker department in the shopping mall
Decentraland location: (-84,11)*

Some early examples of metaverse shops which operate in goods and services with differing jurisdictional legalities are a virtual shop in the CryptoVoxels metaverse where visitors can buy CBD products and have them delivered to various US locations and a shop in The Sandbox metaverse which is planning to host psychedelic therapy sessions in the metaverse⁶¹.

However, while HigherLife's CBD metaverse shop and PSLY.COM's psychedelic retreat limit their sales only to jurisdictions where their products and services are legal, it's possible that other actors could look to exploit the lack of a real-world geographic location that the metaverse has and offer product and services to jurisdictions where they are not legal. These could take the form of explicitly-branded dark markets selling illegal products and services or they may take inspiration from front businesses like the launderettes which inspired the term "money laundering", and purport to sell a perfectly legal service or products, though in reality users may be directed to a Telegram or Discord chat to pay – potentially through cryptoassets – and the items in the metaverse shop are cover items for the real-world illicit goods.

From our exploration of dark net market places and forums it appears that illicit actors do not see metaverse shops as a primary expansion opportunity for them right now and instead are focussing on other dark market activities such as new marketplaces and a move to decentralization.



CASE STUDY M

A 30-second Youtube video⁶² shows a Snapchat screen capture with robotic voice overlay offering a service for buying items such as narcotics and guns and more, which will have a metaverse storefront. The location isn't revealed within the video, so whether such a service is or was ever intended to be created cannot be verified. Yet it illustrates that some bad actors are already looking at the retail opportunities of the metaverse to sell illicit products and services. This could open up a new potential income avenue from customers who are not familiar with or confident in using dark markets.



Sex-related Crimes

There is a theory called Time to Penis⁶³, which predicts how long it will take for a representation of a penis to find its way into a game or online community. This applies whether it is Lego, SecondLife or Minecraft, and the metaverse will not be immune to this trend. Indeed, a lewd picture even made its way to the moon⁶⁴.

Therefore, while there may be many instances of ethical sex practices within the metaverse and opportunities for sex-based businesses to open up within metaverse red-light districts⁶⁵, there are already concerns about how the space could be used for more sinister content such as child sexual abuse materials (CSAM), revenge porn and sexual harassment.

Child Sexual Abuse Material Risks

In 2007, it was discovered⁶⁶ that some individuals on the prominent web2.0 metaverse SecondLife had designed avatars that looked like children and were presenting them in pornographic images as well as using them for in-game sex parties. Fast forward to the web3.0 metaverse, and sadly there remains a problem with bad actors looking to utilize new technology for CSAM.

In Decentraland, it's possible to create interactions for a building on your owned land which links out to external sources such as web pages and documents. You can also host videos on TV screens within a building or auditorium.

The majority of this usage is perfectly legal, though it does carry the risk that malicious actors could use these interactions to link to files which contain CSAM material⁶⁷ or show explicit videos within their metaverse space. Compounding this is the ability for land owners to restrict view access inside their building to specific addresses or token holders. This is usually in place to create member-only areas such as for viewing rare NFT art, avatar-related gameplay such as leaderboard-led mini golf or exclusive entry for events. However, it could also be used by illicit actors to make CSAM content viewable only to those with specific NFTs and therefore hidden for anyone else who stumbles upon or attempts to find the building.

In addition to hosting or providing access to CSAM through the metaverse, there have also been documented cases of children being abused directly in the metaverse. Meta's Horizon Worlds metaverse is reported to already have a child predator problem due to the presence of those under 18 sneaking into the space and limited age verification protections⁶⁸. Furthermore, South Korea has already noted a number of metaverse-based criminal acts relating to children:

"The national police disclosed in April 2021 that an adult allegedly induced a minor to send revealing photos in exchange for in-game items in another metaverse. The adult then used the photos to create sexually exploitative content, said the police, without revealing whether a suspect has been charged."

"South Korea's Ministry of Gender Equality and Family said in September 2021 that a 14-year-old girl had been coerced into taking off her avatar's clothes in a metaverse and then told to have her avatar perform sexual acts."

<https://forkast.news/south-korea-sexual-harassment-minors-metaverse/>

When analyzing the Elliptic data set, we can see that there has been no interaction of CSAM-linked accounts with the metaverse assets MANA and SAND at the time of writing. Though ongoing monitoring and analysis is required to ensure that these types of actors do not start to utilize metaverse-related assets in the future. In addition, more protections will be needed to protect children from direct harm in the metaverse as well as indirect harm facilitated by the space.

Non-Consensual Porn

Virtual porn is a growing phenomenon, with virtual reality headset-driven games like Holodexxx, ImagineVR, and Captain Hardcore as well as VR porn aggregator websites like LewdVRGames. There is a risk that non-consensual virtual porn could become a category within this space⁶⁹ and proliferated or watched within the metaverse.

There are already services available which can create DeepFake-esque VR porn from images of celebrities or ex-partners and this can be used for virtual reality non-consensual sex acts.

“I use it to fulfill my sexual fantasies or replicate sexual encounters with my ex-girlfriends,” one user commented on a subreddit dedicated to creating 3D adult content with Virt-A-Mate⁷⁰

There is an added risk here that nefarious actors could apply this same technology to CSAM and also stream this from the metaverse.

Sexual Harassment

Before there was the metaverse, there were multi-user domains (MUDs) – virtual text based worlds where users navigated through using text commands. One of the most popular MUDs was LambdaMOO, which had a layout that was based on a California mansion. One evening a number of users were in the “living room” talking with one another when a user named Mr. Bungle suddenly deployed a “voodoo doll”. This was a tool which produced text such as “John kicks Bill” – therefore making users appear to perform actions. However, the text deployed made one user appear to perform sexual and violent acts toward two others. Over the following days, there was much debate about how to respond within the virtual world, and eventually a “wizard” eliminated Mr. Bungle from the MUD⁷¹.

This was a text-based sexual harassment case within an early form of the metaverse, though unfortunately there have already been a number of well-documented examples of modern metaverse-related sexual harassment.

Notably, one of the beta testers for Horizon Worlds was accosted and virtually harassed, while a player within the zombie battling game Quivr was virtually molested⁷². Game makers and metaverse creators responded with various protections to push back players who get too close, and SafeZones which act as a bubble around your avatar to block unwanted advances. However, as with the risks around CSAM and sex-based crimes, further efforts will be required to better protect metaverse users from unwanted sexual advances, and ensure that the metaverse can be a safe and enjoyable space for all.

SUMMARY

Preventing Financial Crime in the Metaverse



Key Controls

What's clear is that while the metaverse provides a host of new opportunities and innovation springboards, it is already a space that is being explored by bad actors. Individuals and businesses should therefore ensure they are adequately protected when dealing – both directly and indirectly – with metaverse-related assets. Protections should include:

Screening: In order to protect against money laundering, wash trading and sanctions risks, it is important that any metaverse-related transactions and wallets are screened for illicit connections. This will help to identify any direct or indirect exposure, and ensure that any mitigating steps can be taken. These include conducting further investigations, blocking withdrawals, segregating funds or alerting the relevant authorities. Elliptic's Navigator and Lens tools can help you to manage financial crime risks relating to cryptoasset transactions and wallets.

Conduct due diligence: Before adding support for a metaverse project and related assets, ensure that you have conducted due diligence on the project and team behind it. This can help to ensure that it is not a scam, or has any obvious code exploit risks which could later result in the loss of funds for users holding or trading the metaverse related assets.

Use best in class technology and innovation: Criminals will always seek to use new innovations to try to stay ahead of law enforcement and regulators. As such, it's important that businesses and individuals within the crypto space use best-in-class products and services to catch illicit activity and are aware of emerging risks. Here at Elliptic, we have dedicated teams evolving our products, data set and compliance methodologies to ensure that our products are prepared for the new techniques and technologies which illicit actors may look to leverage.

Glossary

Address: A cryptoasset address is a unique identifier that serves as a virtual location where a digital asset can be sent. The address can be freely shared with others to facilitate transactions.

Airdrop: An airdrop is where a project will gift tokens – most often directly related to the project – to members in the community in order to entice them to use the project's product/service. The amount of tokens someone receives may be proportional to their other activity on the project or everyone may receive the same amount.

Augmented Reality: A technology which superimposes a computer-generated image over a user's view of the real world.

Blockchain: A blockchain is the transaction database shared by all nodes participating in a specific cryptoasset network. A full copy of a network's blockchain contains every transaction ever executed in the asset. It was first introduced in the Bitcoin whitepaper published in October 2008 as the underlying protocol to allow truly peer-to-peer transactions.

CoinJoin: A privacy-preserving transaction where the inputs of a Bitcoin transaction belong to more than one person, but are intended to look as if they are from one person – thus trying to make on-chain analysis less reliable.

Cryptoasset: A cryptoasset is a digital asset that is secured with cryptography and where transactions are distributed and validated by a decentralized set of participants, and recorded on a public ledger known as a blockchain.

Cryptocurrency: The term “cryptocurrency” can be used as an umbrella term for virtual forms of money, but is generally used when talking about assets which are supported by a blockchain like Bitcoin (BTC) and Ethereum (ETH). Cryptocurrencies are not issued or controlled by any government or other central authority. They exist on peer-to-peer networks of computers running free, open-source software. Generally, anyone who wants to participate by owning, sending or spending can do so. The abbreviation “crypto” is often used when speaking and writing.

Dark Market: Dark markets are marketplaces available on the dark web which allow users to sell a range of goods and services. However, due to the largely anonymous nature of the dark web, many of the items for sale are illicit.

Decentralized: Where no central counterparty has unilateral control of a system and consensus across participants is required to effect changes.

Decentralized Finance (DeFi): Decentralized finance (DeFi) is a peer-to-peer, decentralized, censorship-resistant financial system. Common DeFi applications include crypto wallets, lending, borrowing, spot trading, margin trading, interest-earning, market-making, derivatives, options and more.

Digital Land: A virtual representation of real estate in the metaverse. This can be undeveloped or built on, and it's possible to own a single piece of land, multiple pieces or a space of land together.

Discord: A mobile and web-based messaging platform which offers enhanced security and end-to-end encryption.

Ethereum: The Ethereum blockchain is a network with the ambition of being a decentralized world computer. As such, it offers a more function-rich protocol than the Bitcoin blockchain and allows users to transfer the native asset Ether (ETH) as well as creating smart contracts and tokens, or creating more complex decentralized applications (DApps). Ethereum was launched in 2015 and its co-creator Vitalik Buterin is a well known individual in the blockchain world – often speaking at conferences and being active in the space.

ERC20: ERC-20 is a technical standard for the implementation of tokens on the Ethereum blockchain, although it has also been adopted by other compatible blockchains. The rules within the standard include how tokens are transferred between addresses and how data within each token is accessed. Tether (USDT) is a well-known example of an ERC-20 token, and many more can be tracked online.

Flash Loan: A flash loan is a means of borrowing funds – typically used for arbitrage – that must be repaid within the same block. However, there have been recent examples where flash loans have been used nefariously to steal funds and exploit smart contracts.

Giveaway Scam: A type of scam where the bad actor pretends that they will send cryptoassets to anyone who sends a small amount to them. The offer is usually that the person will receive a multiple of the amount they send.

Initial Coin Offering (ICO): A fundraising technique popular in 2017 and '18 where crypto projects raised money by selling tokens relating to their project.

Know Your Customer: Know-your-customer (KYC) standards help protect the financial services industry against fraud, money laundering, corruption and terrorist financing. They involve the checking and verifying of a client's identity both at the onboarding stage and as part of continuing obligations.

LooksRare: A marketplace selling non-fungible tokens.

Malware: Malicious software which bad actors will look to deploy onto a target's computer with the aim of stealing sensitive information.

MetaMask: A popular in-browser crypto wallet where cryptoassets can be sent, received and stored. For many crypto applications and services, users must connect via their MetaMask to access the functionality.

Minting Contract: The smart contract which creates new tokens – fungible or non-fungible – for a project.

NFT Marketplace: A marketplace where users can buy, sell and browse different non-fungible tokens (NFTs).

Non-fungible Tokens (ERC721/ERC1155): A non-fungible token (NFT) is a type of cryptoasset that records ownership of a digital item and unlike cryptoassets such as Ether (ETH) and bitcoin (BTC), it is not mutually interchangeable. Each NFT is a unique asset in the digital world and can be bought and sold like any other item.

Office of Foreign Assets Control (OFAC): The Office of Foreign Assets Control (OFAC) of the US Department of the Treasury administers and enforces economic and trade sanctions based on US foreign policy and national security goals. It works against targeted foreign countries and regimes, terrorists, international narcotics traffickers, those engaged in activities related to the proliferation of weapons of mass destruction, and other threats to the national security, foreign policy or economy of the United States.

OpenSea: The leading marketplace selling non-fungible tokens (NFTs).

Phishing: This is when illicit actors send emails pretending to be from recognized companies or senders in the hope of tracking the recipient to share personal or sensitive information.

Profile Picture Projects (PFPs): A collection of non-fungible tokens (NFTs) – often 10,000 – where each avatar has a combination of unique attributes. These images are usually from the shoulders up and tend to resemble either humans or animals. Owners use these as their profile picture on social media platforms for cultural kudos.

Rug Pull: Where a project will raise capital and then disappear with the money before delivering any roadmap promises.

Smart Contract: A smart contract is a computer program or a transaction protocol which is intended to automatically execute, control or document legally-relevant events and actions according to the terms of a contract or an agreement. It was initially conceived by Nick Szabo in 1998 and later implemented on blockchains such as Ethereum.

Virtual Asset Service Provider (VASP): The Financial Action Task Force (FATF) describes a virtual asset service provider (VASP) as an entity that facilitates any of these five business activities: the exchange between virtual assets and fiat currencies; the exchange between one or more forms of virtual assets; the transfer of virtual assets between crypto wallets; the safekeeping and/or administration of virtual assets or instruments enabling control over virtual assets; or the participation in and provision of financial services related to an issuer's offer and/or sale of a virtual asset.

Telegram: A mobile and web-based messaging platform which offers enhanced security and end-to-end encryption.

Token: The term token refers to a programmable unit of value which is recorded and transferred on a blockchain. However, it is distinct from the native asset which is the cryptoasset created by the protocol and used to pay fees, created as a block subsidy or used in the consensus protocol. The most popular token standard is ERC-20 on the Ethereum blockchain. Tether (USDT) is an example of a token on the Ethereum blockchain. Ether (ETH) is the native asset of Ethereum.

Wallet: A wallet is a collection of cryptoasset addresses and the corresponding private keys. They allow digital assets to be stored – keeping them safe and accessible. They also allow you to send, receive and spend cryptoassets. Wallets can be self-hosted – where you retain control of the private keys – or hosted, which is where a custodian stores the private keys on your behalf.

Wearables: Wearables are clothing and accessories for avatars in the metaverse.

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About the Author



Tara Annison

Head of Technical Crypto Advisory

Tara is a global cryptoasset subject matter expert specializing in Bitcoin, blockchain technology and compliance issues. She regularly publishes thought leadership pieces, and opines on the intersection of technical crypto matters, innovation and traditional finance. Tara has spent years honing product at both Elliptic, crypto startups and HSBC, and is a prolific writer, speaker and entrepreneur.



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